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Test 687: Case Model 611-B

Tractor Museum
University of Nebraska-Lincoln, TractorMuseumArchives@unl.edu

NEBRASKA TRACTOR TEST 687 - CASE 611-B

The University of Nebraska Agricultural Experiment Station

W. V. Lambert, Director; Lincoln, Nebraska

POWER TAKE-OFF PERFORMANCE

Hp	Crank shaft speed rpm	Fuel Consumption Gal per hr	Fuel Consumption Lb per hp-hr	Hp-hr per gal	Temperature Degrees F Cooling medium	Air wet bulb	Air dry bulb	Barometer inches of mercury
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours								
44.56	2250	4.558	0.621	9.78	175	57	75	29.150
Standard Power Take-off Speed (540 rpm)—One Hour								
41.14	1950	4.120	0.607	9.99	177	57	75	29.130
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
38.35	2281	3.872	0.613	9.90	170	57	70	.....
1.12	2396	1.810	9.804	0.62	145	56	74	.....
19.48	2314	2.745	0.855	7.10	156	57	76	.....
44.63	2248	4.515	0.614	9.88	173	57	75	.....
9.85	2340	2.240	1.380	4.40	152	56	75	.....
29.03	2298	3.269	0.683	8.88	163	56	74	.....
Av 23.74	**2313**	**3.075**	**0.786**	**7.72**	**160**	**56**	**74**	**29.125**

DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank shaft speed rpm	% Slip of drive wheels	Fuel Consumption Gal per hr	Fuel Consumption Lb per hp-hr	Hp-hr per gal	Temp. Degrees F Cool-ing med	Air wet bulb	Air dry bulb	Barometer inches of mercury
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—5th Gear											
37.04	3233	4.30	2200	5.86	4.408	0.722	8.40	150	37	46	29.103
32.61	4089	2.99	2094	7.38	4.355	0.810	7.49	159	37	45	torq conv
75% of Pull at Maximum Power—Ten Hours and Two Hours—5th Gear											
29.44	2424	4.55	2305	4.73	3.713	0.765	7.93	164	57	69	28.451
28.93	2993	3.63	2265	5.38	4.179	0.876	6.92	152	35	42	torq conv
50%of Pull at Maximum Power—Two Hours—5th Gear											
20.26	1606	4.73	2360	3.46	3.078	0.922	6.58	141	38	40	29.073
20.60	2020	3.82	2335	3.99	3.357	0.989	6.14	146	37	43	torq conv
MAXIMUM POWER WITH BALLAST											
35.07	5216	2.52	2250	12.96	2nd Gear.....			147	47	52	28.680
36.35	4835	2.82	2252	11.40	3rd Gear.....			154	47	52	28.680
36.54	3915	3.50	2251	8.09	4th Gear.....			151	50	55	28.690
37.50	3215	4.37	2252	6.28	5th Gear.....			149	50	55	28.690
36.63	2346	5.85	2250	4.66	6th Gear.....			148	50	55	28.690
34.53	1413	9.16	2255	2.71	7th Gear.....			148	50	55	28.690
29.51	5462	2.03	2245	13.94	2nd Gear (Torq Conv)			156	47	57	28.945
31.16	5361	2.18	2191	13.57	3rd Gear (Torq Conv)			167	47	57	28.945
31.55	4491	2.63	2156	10.24	4th Gear (Torq Conv)			172	53	64	28.765
32.91	4009	3.08	2119	8.58	5th Gear (Torq Conv)			175	53	64	28.765
32.57	2881	4.24	2122	6.02	6th Gear (Torq Conv)			173	54	67	28.725
31.38	1857	6.34	2099	3.93	7th Gear (Torq Conv)			173	54	67	28.725
MAXIMUM POWER WITHOUT BALLAST											
33.99	3016	4.23	2258	10.32	5th Gear.....			141	38	45	29.200
28.72	3332	3.23	2200	13.32	5th Gear (Torq Conv)			145	38	45	29.200

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—5th Gear

Pounds pull	3200	3450	3550	3500	3650	3800	....
Horsepower	37.5	35.9	33.1	28.9	25.3	22.3	....
Miles per hour	4.4	3.9	3.5	3.1	2.6	2.2	....
Pounds pull (Torq Conv)	4000	4400	4825	5300	5800	....	....
Horsepower (Torq Conv)	32.9	31.7	29.6	28.3	24.7	....	....
Miles per hour (Torq Conv)	3.1	2.7	2.3	2.0	1.6	....	....

TIRES, BALLAST and WEIGHT		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 13.9-36;6;20	Two 13.9-36;6;14
Ballast	—Liquid	431 lb each	None
	—Cast iron	1080 lb each	None
Front tires	—No, size, ply & psi	Two 6.00-16;4;24	Two 6.00-16;4;24
Ballast	—Liquid	None	None
	—Cast iron	71 lb each	None
Height of drawbar		16 inches	17 inches
Static weight	—Rear	6262 lb	3240 lb
	—Front	1612 lb	1470 lb
Total weight with operator		8049 lb	4885 lb

Department of Agricultural Engineering
Dates of Test: March 19 to April 16, 1959
Manufacturer: J. I. CASE COMPANY, RACINE, WISCONSIN
Manufacturer's Power Rating: Not Rated

FUEL, OIL and TIME Fuel Regular Gasoline **Octane No ASTM** 83 **Research** 91 (Rating taken from oil company's typical inspection data) **Specific gravity converted to 60°/60°** 0.7285 **Weight per gallon** 6.066 lb **Oil SAE** 20-20W **API** service classification MS **To motor** 1.949 gal **Drained from motor** 1.688 gal **Transmission and final-drive lubricant** SAE No 90 **Type** EP **Total time motor was operated** 51 hours.

ENGINE Make Case **Type** 4 cylinder vertical **Serial No** 176P09843 **Crankshaft mounted** lengthwise **Rated rpm** 2250 **Lubrication** pressure **Bore and stroke** 3 9/16" x 4 1/8" **Compression ratio** 7.26 to 1 **Displacement** 164.5 cu in **Carburetor size** 1¼" **Ignition system** battery **Cranking system** 12 volt battery **Air cleaner** oil washed wire mesh **Muffler** was used **Oil filter** not used **Cooling medium temperature control** thermostat.

CHASSIS Type tricycle **Serial No** 6122894 **Tread width** rear 54" to 88" front 9⅛" and 15⅛" **Wheel base** 87" **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 36½" Vertical distance above roadway 34⅜" Horizontal distance from center of rear wheel tread 0" to the right or left **Hydraulic control system** direct engine drive **Advertised speeds mph (Direct Drive)** first 1.5 second 2.2 third 2.5 fourth 2.9 fifth 3.6 sixth 4.7 seventh 7.0 eighth 11.2 reverse 1.8 and 2.9 **(Torque Converter Drive)** first 0 to 1.5 second 0 to 2.2 third 0 to 2.5 fourth 0 to 2.9 fifth 0 to 3.6 sixth 0 to 4.7 seventh 0 to 7.0 eighth 0 to 11.2 reverse 0 to 1.8 and 0 to 2.9 **Belt pulley** diam 9¼" face 6⅜" rpm 1283 **Belt speed** 3100 fpm **Clutch** multiple disc main hydraulic power-clutch operated by piston thru foot pedal control valve and single disc direct drive hydraulic clutch, locking turbine to engine thru hand operated control valve **Brakes** double disc operated by two foot pedals **Power take-off** 536 rpm at 1950 engine rpm **Steering** power assisted **Turning radius** (on concrete surface with brake applied) right 97" left 97" (on concrete surface without brake) right 97" left 97" **Turning space diameter** (on concrete surface with brake applied) right 202" left 202" (on concrete surface without brake) right 202" left 202".

REPAIRS AND ADJUSTMENTS No repairs or adjustments.

REMARKS All test results were determined from observed data obtained in accordance with SAE and ASAE test code. Only 12 gears, as selected by manufacturer's representative, were used in making the maximum power runs with ballast.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No 687.

L. F. LARSEN
Engineer-in-Charge

L. W. HURLBUT
G. W. STEINBRUEGGE
J. J. SULEK
Board of Tractor
Test Engineers

EXPLANATION OF TEST REPORT

GENERAL CONDITIONS

Each tractor is a production model equipped for common useage. Power consuming accessories can be disconnected only when it is convenient for the operator to do so in practice. Additional weight can be added as ballast if the manufacturer regularly supplies it for sale. The static tire loads and the inflation pressures must conform to recommendations in the Tire Standards published by the Society of Automotive Engineers.

PREPARATION FOR PERFORMANCE RUNS

The engine crankcase is drained and refilled with a measured amount of new oil conforming to specifications in the operators manual. The fuel used and the maintenance operations must also conform to the published information delivered with the tractor. The tractor is then limbered-up for 12 hours on drawbar work in accordance with the manufacturers published recommendations. The manufacturers representative is present to make appropriate decisions regarding mechanical adjustments.

The tractor is equipped with approximately the amount of added ballast that is used during maximum drawbar tests. The tire tread-bar height must be at least 65% of new tread height prior to the maximum power run.

BELT OR POWER TAKE-OFF PERFORMANCE

Maximum Power and Fuel Consumption. The manufacturers representative makes carburetor, fuel pump, ignition and governor control settings which remain unchanged throughout all subsequent runs. The governor and the manually operated governor control lever is set to provide the high-idle speed specified by the manufacturer for maximum power. Maximum power is measured by connecting the belt pully or the power take-off to a dynamometer. The dynamometer load is then gradually increased until the engine is operating at the rated speed specified by the manufacturer for maximum power. The corresponding fuel consumption is measured.

Varying Power and Fuel Consumption. Six different horsepower levels are used to show corresponding fuel consumption rates and how the governor causes the engine to react to the following changes in dynamometer load: 85% of the dynamometer torque at maximum power; minimum dynamometer torque, ½ the 85% torque; maximum power; ¼ and ¾ of the 85% torque. Since a tractor is generally subjected to varying loads the average of the results in this test serve well for predicting the fuel consumption of a tractor in general useage.

DRAWBAR PERFORMANCE

All engine adjustments are the same as those used in the belt or power take-off tests. If the manufacturer specifies a different rated crankshaft speed for drawbar operations, then the position of the manually operated governor control is changed to provide the high-idle speed specified by the manufacturer in the operating instructions.

Varying Power and Fuel Consumption With Ballast. The varying power runs are made to show the effect of speed-control devices (engine governor, automatic transmissions, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the tractor maintain the travel speed at maximum horsepower on the straight sections of the test course; (2) 75% of the pull at maximum power; and (3) 50% of the pull at maximum power. Prior to 1958, fuel consumption data (10 hour test) were shown only for the pull obtained at maximum power for tractors having torque converters and at 75% of the pull obtained at maximum power for gear-type tractors.

Maximum Power with Ballast. Maximum power is measured on straight level sections of the test course. Data are shown for not more than 12 different gears or travel speeds. Some gears or travel speeds may be omitted because of high slippage of the traction members or because the travel speed may exceed the safe-limit for the test course. The maximum safe speed for the Nebraska Test Course has been set at 15 miles per hour. The slippage limits have been set at 15% and 7% for pneumatic tires and steel tracks or lugs, respectively. Higher slippage gives widely varying results.

Maximum Power Without Ballast. All added ballast is removed from the tractor. The maximum drawbar power of the tractor is determined by the same procedure used for getting maximum power with ballast. The gear (or travel speed) is the same as that used in the 10-hour test.

Varying Power and Travel Speed with Ballast. Travel speeds corresponding to drawbar pulls beyond the maximum power range are obtained to show the "lugging ability" of the tractor. The run starts with the pull at maximum power; then additional drawbar pull is applied to cause decreasing speeds. The run is ended by one of three conditions; (1) maximum pull is obtained, (2) the maximum slippage limit is reached, or (3) some other operating limit is reached.

For additional information about the **Nebraska Tractor Tests** write to the **Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska.**

Case 611-B